

WHAT IS CLAIMED IS:

1. A head position control apparatus that controls a position of a head that performs read and write of information with respect to a medium rotated and driven by a spindle, the spindle including a hydrodynamic bearing, comprising:
  - a judgment unit that judges whether gyroscopic moment of the spindle is out of a predetermined range; and
  - a control unit that controls the position of the head to compensate for the inclination of the spindle upon a judgment by the judgment unit that the gyroscopic moment is out of the predetermined range.
2. The head position control apparatus according to claim 1, further comprising a detecting unit that detects an inclination of the spindle, and if the inclination detected exceeds a predetermined threshold the judgment unit judges that the gyroscopic moment is out of the predetermined range.
3. The head position control apparatus according to claim 1, further comprising a detecting unit that detects a change in the revolution speed of the spindle, and if the change in the revolution speed detected exceeds a predetermined threshold the judgment unit judges that the gyroscopic moment is out of the predetermined range.

4. The head position control apparatus according to claim 1,  
further comprising a detecting unit that detects an amplitude of  
respective orders in a repeatable runout of the spindle, and if an  
amplitude of a specific order, which affects read and write of information,  
5 exceeds a predetermined threshold, the judgment unit judges that the  
gyroscopic moment is out of the predetermined range.
5. The head position control apparatus according to claim 1,  
further comprising a detecting unit that detects whether it is possible to  
10 read and write information from or into the medium, and if a state that  
read and write of information from or into the medium occurs  
repetitively in a predetermined cycle, the judgment unit judges that the  
gyroscopic moment is out of the predetermined range.
- 15 6. The head position control apparatus according to claim 1,  
further comprising a detecting unit that detects whether it is possible to  
read and write information from or into the medium, and if a state that  
read and write of information from or into the medium continue for a  
predetermined period, the judgment unit judges that the gyroscopic  
20 moment is out of the predetermined range.
7. The head position control apparatus according to claim 1,  
wherein the control unit calculates a phase correction quantity and an  
amplitude correction quantity with respect to a basic repeatable runout  
25 of the spindle, and controls the position of the head to compensate for

the inclination of the spindle based on the phase correction quantity and the amplitude correction quantity, wherein

the basic repeatable runout of the spindle is obtained by a predetermined oscillation test performed in advance.

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8. The head position control apparatus according to claim 1, wherein the control unit controls the position of the head by executing a repeat control.

10 9. The head position control apparatus according to claim 1, wherein the control unit controls the position of the head by using a compression filter.

10. The head position control apparatus according to claim 7, wherein the control unit controls the position of the head to compensate for the inclination of the spindle resulting from the repeatable runout of a specific order, which affects read and write of information, of the respective orders in the repeatable runout of the spindle.

20 11. The head position control apparatus according to claim 8, wherein the control unit controls the position of the head to compensate for the inclination of the spindle resulting from the repeatable runout of a specific order, which affects read and write of information, of the respective orders in the repeatable runout of the spindle.

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12. The head position control apparatus according to claim 9,  
wherein the control unit controls the position of the head to compensate  
for the inclination of the spindle resulting from the repeatable runout of  
a specific order, which affects read and write of information, of the  
5 respective orders in the repeatable runout of the spindle.

13. The head position control apparatus according to claim 7,  
wherein the control unit controls the position of the head to compensate  
for the inclination of the spindle resulting from the repeatable runout of  
10 a specific order, which affects read and write of information, and whose  
amplitude exceeds the predetermined threshold, of the respective  
orders in the repeatable runout of the spindle.

14. The head position control apparatus according to claim 8,  
15 wherein the control unit controls the position of the head to compensate  
for the inclination of the spindle resulting from the repeatable runout of  
a specific order, which affects read and write of information, and whose  
amplitude exceeds the predetermined threshold, of the respective  
orders in the repeatable runout of the spindle.

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15. The head position control apparatus according to claim 9,  
wherein the control unit controls the position of the head to compensate  
for the inclination of the spindle resulting from the repeatable runout of  
a specific order, which affects read and write of information, and whose  
25 amplitude exceeds the predetermined threshold, of the respective

orders in the repeatable runout of the spindle.

16. A method of controlling a position of a head that performs read and write of information with respect to a medium rotated and driven by a spindle, the spindle including a hydrodynamic bearing, comprising:
- 5 judging whether gyroscopic moment of the spindle is out of a predetermined range; and
- controlling the position of the head to compensate for the inclination of the spindle upon a judgment at the judging that the
- 10 gyroscopic moment is out of the predetermined range.
17. The head position control method according to claim 16, further comprising detecting an inclination of the spindle, and if the inclination detected exceeds a predetermined threshold, it is judged at the judging
- 15 that the gyroscopic moment is out of the predetermined range.
18. The head position control method according to claim 16, further comprising detecting a change in the revolution speed of the spindle, and if the change in the revolution speed detected exceeds a
- 20 predetermined threshold, it is judged at the judging that the gyroscopic moment is out of the predetermined range.
19. The head position control method according to claim 16, further comprising detecting an amplitude of respective orders in the
- 25 repeatable runout of the spindle, and if the amplitude of a specific order,

which affects read and write of information, exceeds a predetermined threshold, it is judged at the judging that the gyroscopic moment is out of the predetermined range.

5    20.    The head position control method according to claim 16, further comprising detecting whether it is possible to read and write information from or into the medium, and if a state that read and write of information from or into the medium occurs repetitively in a predetermined cycle, it is judged at the judging that the gyroscopic moment is out of the  
10    predetermined range.

21.    The head position control method according to claim 16, further comprising detecting whether it is possible to read and write information from or into the medium, and if a state that read and write of information  
15    from or into the medium continue for a predetermined period, it is judged at the judging that the gyroscopic moment is out of the predetermined range.

22.    The head position control method according claim 16, further  
20    comprising:

calculating the phase correction quantity and the amplitude correction quantity with respect to the basic repeatable runout of the spindle, wherein the basic repeatable runout of the spindle is obtained by a predetermined oscillation test performed in advance; and  
25    controlling the position of the head to compensate for the

inclination of the spindle based on the phase correction quantity and the amplitude correction quantity.

23. The head position control method according to claim 16,  
5 wherein the controlling includes controlling the position of the head by executing repeat control.

24. The head position control method according to claim 16,  
wherein the controlling includes controlling the position of the head by  
10 using a compression filter.

25. The head position control method according to claim 22,  
wherein the controlling includes controlling the position of the head to  
compensate for the inclination of the spindle resulting from the  
15 repeatable runout of a specific order, which affects read and write of  
information, of the respective orders in the repeatable runout of the  
spindle.

26. The head position control method according to claim 23,  
20 wherein the controlling includes controlling the position of the head to  
compensate for the inclination of the spindle resulting from the  
repeatable runout of a specific order, which affects read and write of  
information, of the respective orders in the repeatable runout of the  
spindle.

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27. The head position control method according to claim 24,  
wherein the controlling includes controlling the position of the head to  
compensate for the inclination of the spindle resulting from the  
repeatable runout of a specific order, which affects read and write of  
5 information, of the respective orders in the repeatable runout of the  
spindle.

28. The head position control method according to claim 22,  
wherein the controlling includes controlling the position of the head to  
10 compensate for the inclination of the spindle resulting from the  
repeatable runout of a specific order, which affects read and write of  
information, and whose amplitude exceeds the predetermined threshold,  
of the respective orders in the repeatable runout of the spindle.

15 29. The head position control method according to claim 23,  
wherein the controlling includes controlling the position of the head to  
compensate for the inclination of the spindle resulting from the  
repeatable runout of a specific order, which affects read and write of  
information, and whose amplitude exceeds the predetermined threshold,  
20 of the respective orders in the repeatable runout of the spindle.

30. The head position control method according to claim 24,  
wherein the controlling includes controlling the position of the head to  
compensate for the inclination of the spindle resulting from the  
25 repeatable runout of a specific order, which affects read and write of



information, and whose amplitude exceeds the predetermined threshold,  
of the respective orders in the repeatable runout of the spindle.

31. A computer program for realizing on a computer controlling a  
5 position of a head that performs read and write of information with  
respect to a medium rotated and driven by a spindle, the spindle  
including a hydrodynamic bearing, comprising:

judging whether gyroscopic moment of the spindle is out of a  
predetermined range; and

10 controlling the position of the head to compensate for the  
inclination of the spindle upon a judgment at the judging that the  
gyroscopic moment is out of the predetermined range.